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Proposed method of optical spin read-out in a quantum dot using the AC Stark effect EDWARD FLAGG, GARY LANDER, CABOT ZABRISKIE, West Virginia University — We propose a method to read-out the spin-state of a single electron trapped in a quantum dot via a cycling transition induced by the AC Stark effect. Optical spin initialization and manipulation are allowed by a magnetic field in the Voigt configuration, which modifies the polarization selection rules of the transitions. The lack of a cycling transition in the Voigt configuration, however, makes read-out of the spin-state very difficult. We show that cycling transitions can be made possible by a red-detuned, circularly-polarized laser, which modifies the spin eigenstates and polarization selection rules via the AC Stark effect.

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